Pinal Creek

Boundaries:

The site is located in the Globe-Miami area of Gila County and has irregular boundaries. Within the southern portion of the site, the boundary follows and includes the entire mine sites of Phelps Dodge Miami, Inc. (Phelps Dodge Miami Mine, formerly known as the Inspiration Mine) and BHP Copper, Inc. (the Miami Mine, the Copper Cities Mine, the Old Dominion Mine and related properties and the Solitude Tailings). The southern boundary follows the southern margin of the floodplain of Bloody Tanks Wash through the town of Miami and the community of Claypool, then turns south to include the BHP Solitude Tailings. The boundary follows the eastern margin of the floodplain of Russell Gulch and Miami Wash northward to the confluence with Pinal Creek. The boundary parallels both sides of upper Pinal Creek to the city of Globe, including the Old Dominion Mine and related mine properties in the Globe Hills. North of the confluence of Miami Wash and Pinal Creek, the boundary parallels Pinal Creek on both sides including the floodplain of Pinal Creek plus a margin approximately 1,000 feet wide surrounding the floodplain as far north as Inspiration Dam. North of Inspiration Dam, the boundary follows the floodplain of Pinal Creek. The northern boundary terminates at the Salt River.

Site History:

- Mining and mineral processing began in the Globe-Miami area in 1878 with the discovery of silver in the Globe Hills. By 1893, copper had replaced silver as the main commodity produced in the district, and continues to be today. Releases of contaminants from mine and processing sites started shortly after mining, milling, and smelting began.

- Groundwater contamination was first discovered in the 1930s in the alluvial aquifer of Miami Wash. In the 1940s, groundwater contamination was discovered in the alluvial aquifer of Bloody Tanks Wash. The first public supply wells were contaminated in the late 1940s, and private wells along lower Pinal Creek were first impacted in the 1970s.

- The first area-wide investigation of groundwater and surface water contamination was conducted in 1979-81. Widespread groundwater and surface water contamination was documented. Releases of contaminants and hazardous substances have occurred from all of the major mining and processing sites from a variety of different sources, including, but not limited to, process solution impoundments, tailings piles, leach dumps, waste rock piles, spills, and as storm water runoff. Erosion of waste piles, especially tailings piles, has also resulted in the release of contaminants to water courses. Particulate fallout of wind-blown tailings and from copper smelters in the area has also contributed to the spread of contamination at the site.

- Source control actions began in 1986 under order from EPA for violations of the Clean Water Act. In 1989, the site was listed on the WQARF Priority List by the state of Arizona. In 1989, the Pinal Creek Group (a consortium of Phelps Dodge, BHP Copper Inc., and Inspiration Consolidated Copper Co.) was formed to conduct the remedial investigations and

begin remedial actions. The groundwater remedial investigation began in 1990. In 1990, the interim remedial action began which consisted of groundwater extraction from the alluvial aquifer at four locations.

- In 1994 the Pinal Creek Group began a private well testing and replacement program, which continues today.

- Ecological and Human-Health risk assessments and the groundwater feasibility study and recommended remedial action plan (RRAP) were completed by 1997. The RRAP proposed groundwater extraction at two locations, upstream and downstream containment of the plume, construction of two lime neutralization treatment plants, private well replacement, source control, and special well construction and abandonment requirements.

- A consent decree governing the clean up was signed in 1997, and approved by the U.S. District Court in 1998. A WQARF administrative order to implement an early response action was signed in 1998 to expedite construction of the Lower Pinal Creek (LPC) treatment plant, begin groundwater extraction at the leading edge of the acid-metal plume, and to prevent further degradation of the perennial reach of Pinal Creek.

- Initial source control remedial investigations and associated feasibility studies were completed by 1998. Numerous source and exposure control actions have been implemented at the various mine sites, including facility upgrades, groundwater extraction, groundwater containment, removal from service of solution impoundments, capping/covering of tailings, management controls, institutional controls, storm water controls and many others.

- In October 1998, the site was placed on the WQARF Registry with an eligibility and evaluation (E&E) score of 97 out of 120.

- In November 1999, the LPC Treatment plant was completed and groundwater extraction at the leading edge of the acid-metal plume began.

- In January 2001, a groundwater barrier (soil-cement-bentonite slurry wall) was constructed across lower Pinal Creek, which serves as the downstream containment of the plume. Full scale groundwater extraction began just above the barrier for neutralization and metal removal in the LPC Treatment Plant.

- In May 2001, a second treatment plant (Diamond H Treatment Plant) was completed to treat water captured from the Kiser Basin (upstream) containment.

- In June 2001, a groundwater well field (Kiser Basin well field) that serves as the upstream containment of the acid-metal plume was completed, and groundwater extraction began.

- In 2002, remedial construction of the engineered cap of the BHP Copper Old Dominion Mine tailings and waste rock began to prevent acid-metal runoff from reaching upper Pinal Creek began. Major construction is complete and revegetation of the piles will begin during the

spring of 2004. Runoff sampling conducted during 2003 after capping of waste rock and tailings piles has documented major improvements in runoff water quality.

- In spring 2004 revegetation of the BHP Copper Old Dominion Mine waste rock and tailings was completed.

- In early summer of 2004 a failure of the Diamond H pit wall threatened the Diamond H Treatment Plant which was subsequently deconstructed. A temporary batch plant was constructed nearby to allow for continued treatment of acid-metal groundwater from the Kiser Basin containment well field.

- In the spring of 2005 Bloody Tanks Wash adjacent to the BHP Copper-Miami was widened. The retaining wall that separated Bloody Tanks Wash from the former Miami Tailings No. 2 was removed and the tailings behind the wall were relocated onto the remaining tailings leftover from the previous reprocessing operation. The remaining tailings at the BHP Miami Unit lie outside of the 100 year floodplain.

- In the summer of 2005 reclamation of the remaining tailings at the BHP Copper-Miami Unit began. The tailings are being capped with clean fill, consolidated, regraded, and storm water channels and storm water and sediment ponds are being constructed.

- In the late part of summer of 2005 BHP began a site characterization/remedial investigation of the Solitude Tailings Impoundment located in Solitude Canyon (a tributary of Russell Gulch. The investigation will include soil borings, test pits and groundwater monitor well installation. Samples will be collected for chemical analysis, agronomic testing, geotechnical testing and stability analysis.

- In late 2004 a new location for the treatment plant was selected and in September 2005 design plans were prepared and submitted for review. The plant will be relocated near the southeast corner of the Diamond H Pit. Stability analyses were conducted and the critical components of the plant will be constructed outside of any areas of high for slope and rock failure.

Site Status:

- ADEQ continues to review source control remedial investigations and feasibility studies at the Phelps Dodge and BHP Copper mining and processing facilities. Source control remedial actions are being implemented at all Phelps Dodge and BHP Copper mining facilities.

- Investigations into soil and stream sediment contamination are underway. The Phase I sampling of soil and stream sediment was completed in April 2004. The results of the Phase I soil and stream sediment investigations were submitted in November of 2005. A risk assessment was included as part of that submittal.

- Site wide groundwater, surface water, and discharge monitoring are on going.

- Approximately 80 to 100 wells, four surface water sites, and treated effluent from the LPC Treatment Plant are monitored on a monthly basis.

- As of November 2004, approximately 100 million pounds of heavy metals (aluminum, beryllium, cadmium, cobalt, copper, iron, lead, manganese, nickel, and zinc) have been removed from aquifers at the site. This water has been treated and released to Pinal Creek, reused at the mines, or evaporated at the mines.

- The perennial and ephemeral reaches of Pinal Creek, Miami Wash, and Bloody Tanks Wash have been removed from the State's list of impaired water bodies.

- In February of 2005 the Pinal Creek Group submitted a request to the ADEQ Water Quality Division to change the designate uses of a portion of perennial Pinal Creek. The request is to change the creek from an aquatic and wildlife warm water to an aquatic and wildlife effluent-dominated stream. The Pinal Creek Group also requested dropping the fish consumption designation. Those requests are currently under consideration.

- In September of 2005 the Pinal Creek Group submitted a formal petition for the removal of the fish consumption designation from a portion of perennial Pinal Creek. Also submitted at that time was a use attainability analysis for the fish consumption use.

- In September 2005 the Pinal Creek Group submitted a formal petition to re-classify a portion of Pinal Creek as an effluent-dependent water.

Site Hydrogeology:

- The Pinal Creek basin is bounded by the Pinal Mountains to the south and by the Apache Peaks and Globe Hills to the east. The setting is a typical basin and range structure that has northwest-trending ranges of igneous and metamorphic rocks separated by a valley that is filled with alluvial deposits. Consolidated and semi-consolidated basin-fill deposits (known as the Gila Conglomerate) that occur in Pinal Creek were created by late Cenozoic block faulting. Unconsolidated alluvium overlies the Gila Conglomerate and ranges from 300 to 800 meters wide and may be as thick as 50 meters. Major surface water bodies in the basin include Bloody Tanks Wash and Russell Gulch, which join to form Miami Wash, which flows northward into Pinal Creek.

- There are two principal aquifers in the basin: the regional Gila Conglomerate aquifer and the shallow alluvial aquifer. The Gila Conglomerate aquifer is the main source of water for domestic and industrial use. The Gila Conglomerate contains significant quantities of calcium carbonate which can neutralize acidic water, and is much less permeable than the alluvial aquifer, both of which have helped to protect it from extensive contamination. Contamination by acid-metal bearing water is largely localized within the alluvial aquifer.

- Surface water in the basin is mostly ephemeral occurring only in response to precipitation events. Perennial flow in Pinal Creek begins at the north end of the channel where the groundwater table intersects the surface due to a truncation of the alluvial and Gila Conglomerate aquifers by bedrock.

Contaminants:

The major contaminants of concern at this site include aluminum, arsenic, beryllium, cadmium, copper, cobalt, iron, manganese, nickel, sulfate, zinc, and sulfuric acid (acidity). Other contaminants of concern include radiochemicals (uranium, radium), fluoride, chromium, lead, mercury, and high levels of dissolved solids. Contaminants of concern at the site may change as new data become available.

Public Health Impact:

Direct exposure to the contaminants could occur from the consumption of contaminated surface water or groundwater, or from the ingestion or inhalation of contaminated soil particles. Water provided by the local water suppliers (the Arizona Water Co., the City of Globe and others) comes from the deeper regional aquifer and meets both state and federal water quality standards. Residents in unincorporated portions of the county rely on private wells. The Pinal Creek Group has implemented a private well replacement program since 1994 and offers free testing of private wells in the site. Approximately 90 wells have been replaced to date.

Community Involvement Activities:

Community outreach activities for this site are conducted by the Pinal Creek Group with ADEQ oversight and support. An open house was held in October 2002 prior to initiation of the remedial construction at the BHP Copper Inc. - Old Dominion Mine. The Pinal Creek Group routinely generates newsletters, press releases, and fact sheets, conducts briefings for interested parties, conducts tours of treatment facilities, and participates in interviews on local radio stations.

Information Repositories:

Interested parties can review site information at the information repository at the Miami Memorial Library located at 1052 Adonis in Miami, (928) 473-4403. BHP Copper - Old Dominion Mine files can be found at the Globe Public library located at 339 S. Broad Street in Globe, (928) 425-6111. With 24 hour notice, an appointment to review relating documentation is available Monday through Friday from 8:30 a.m. to 4:30 p.m., at the ADEQ Records Management Center, 1110 W. Washington Street in Phoenix, Arizona. Please contact (602) 771-4380 or (800) 234-5677 to schedule an appointment to review these documents.

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*In Arizona, but outside the Phoenix area, call toll-free at (800) 234-5677.